A RE-BALANCING ACT? UNDERSTANDING PATTERNS IN REFUNDS AND BALANCES DUE

Laura Kawano, Shanthi Ramnath, and *Patricia K. Tong,*
U.S. Department of Treasury

INTRODUCTION

THE MAJORITY OF TAXPAYERS RECEIVE TAX refunds, where a refund results from tax payments made throughout the year (through tax withholdings and estimated tax payments) in excess of the actual level of tax liability.[1] This behavior is puzzling because these individuals forego both interest earned on and consumption of the excess payment. A relatively smaller number of individuals owe a balance at the end of the tax year. Taxpayers who owe a small balance effectively obtained an interest-free loan from the government. On the other hand, when tax payments are grossly underpaid a penalty can be incurred and must be paid in addition to the balance owed.

A number of studies have tried to explain the prevalence of refunds. Some studies hypothesize that refunds are a result of forced savings (Thaler, 1994; Neumark, 1995; Fennell, 2006). Highfill et al. (1998) develop a model where over payments are an optimal response to insure against uncertain tax liability. Jones (2012) argues that refund behavior is driven by defaults in the withholdings tables that are skewed toward receiving a refund and inertia in taxpayer behavior. He finds evidence of inertia by separately examining responses to exogenous shocks in the withholding formula and tax liability.

In this paper, we examine the persistence in tax refunds due and tax balances owed by considering how a taxpayer's relative location along the tax balance distribution evolves over time. We use a panel of tax returns that spans 1999 to 2009. We first split the sample into those that owe a balance and those that are due a refund, and then split each group based on whether taxpayers are above or below their respective group's median balance relative to taxable income for each year. We examine year-to-year changes in a taxpayer's relative location in the balance distribution based on these four groups.

While previous analysis has documented persistence in refunds, we do not necessarily expect to see a similar degree of persistence among taxpayers with balances due. Individuals may have an aversion to making a large one-time payment or to facing potential penalties for underpayment. In addition, while some individuals may simply derive positive utility from receiving a refund and so continue this behavior, taxpayers who owe relatively large balances may adjust their payments in the next period. Nonetheless, we find evidence of persistence in both receiving a refund and in owing a balance, though this persistence is stronger for those with refunds within a two-year period. These patterns are found even when controlling for demographic characteristics, income, and time-invariant unobservable characteristics, such as a preference for receiving a refund.

We additionally look at tax balance patterns over a longer time horizon where taxpayers are categorized based on their relative balance position at the start of the sample. Conditional on having a large refund in 1999, there is strong persistence in receiving a large refund throughout the panel. Rarely do those in this group transition to owing a balance. Conditional on having a large balance due in 1999, taxpayers exhibit some persistence in owing balances over time. However, these taxpayers appear to move among all four balance groups over time.

DATA

We construct a panel of tax returns for tax years 1999-2009 using data from the Continuous Working History Sample (CWHS) collected by the Statistics of Income (SOI) division of the Internal Revenue Service. The CWHS is a random sample of taxpayers based on the last four digits of each primary filer's social security number. The data contain line items from the IRS Form 1040, including balance amount, estimated tax payments,

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federal tax withholdings, adjusted gross income (AGI), marital status, state, and number exemptions claimed for children living at home. All monetary values are converted to real 2009 dollars using the Consumer Price Index (CPI). The SOI data also include date of birth and gender obtained from Social Security Administration records.

We make several restrictions to the data. First, we include only those observations where the primary filer is aged 30 to 55 to target the working-age population. Second, we exclude dependent tax returns and returns with marital status listed as widow or "other." Lastly, we exclude tax filing units that do not reside within the 50 states or Washington DC. After these restrictions, there are 289,248 observations, which represent 47,835 distinct primary tax filers. Overall, over 80 percent of the sample receives a refund, with an average refund amount of $1,625 dollars.

We categorize each tax return into four categories based on its relative balance within a given tax year. We first split the sample each year based on whether a tax return is eligible for a refund or owes a balance. Next, we split these two samples in half based on median refund amount[2] due and the median balance owed as a proportion of taxable income.[3] Due to the prevalence of refunds, there are fewer tax returns found in the balance-owed groups than in the refund groups.

Table 1 provides summary statistics by these categories. Tax filing units that receive a large refund are slightly younger and have more children, on average, than those in the other groups. Tax filing units with the largest balances due are among the richest, with the highest average median AGI across all four categories. They are also more likely to have business income and make estimated tax payments. Because the default withholding schedule for wage earnings tends to overwithhold income and estimated tax payments are a more active choice made by taxpayers, this relationship may not be very surprising.

METHODOLOGY AND RESULTS

Year-to-Year Transitions

To analyze the persistence of refunds due and balances owed, we compare each tax return's relative location to its relative location in the following year, where relative location is determined by the ratio of balance amount to taxable income as previously described. Table 2 contains this tabulation for the overall sample. The table also provides transition probabilities between consecutive years.

Table 2 provides evidence of the persistence in refunds that has been documented in previous literature (e.g. Jones, 2012). This persistence is particularly strong for the large refund group, despite that a large refund may indicate to a taxpayer that he should adjust his withholdings to better target his actual tax liability. For taxpayers receiving a large refund in the previous year, 66 percent of them receive a large refund again in the following year. Those who receive refunds (both large and small) rarely transition to owing balances. In fact, of those receiving a refund, less than 10 percent of them transition into owing a balance in the following year. Persistence in balances owed is also evident, though somewhat weaker than that found in refunds. For those with a balance owed in a particular year, roughly 54 percent owe a balance again in the following year. We also find evidence that owing a large balance may trigger an adjustment by taxpayers, with almost 21 percent of those with a large balance owed moving to having a large refund due in the following year.

The analysis thus far does not account for family composition, income, or unobservable differences across taxpayers. To better understand these transition probabilities and control for other characteristics, we estimate linear probability models of the following form:

$$\begin{aligned}\text{Prob}(\text{BalanceGroup} = 1) = {} & \alpha_0 + \alpha_1 \text{LargeBalance}_{it-1} \\ & + \alpha_2 \text{SmallBalance}_{it-1} + \alpha_3 \text{LargeRefund}_{it-1} \\ & + X_{it}'\beta + \gamma_t + \mu_i + \varepsilon_{it}\end{aligned}$$

where X contains an indicator for whether the household is married filing jointly and age of the primary (level and square), γ_t contains year fixed effects, and μ_i are taxpayer-specific fixed effects. We omit the group of taxpayers who receive small refunds. We then run this regression separately with each of the four balance experience groups as our dependent variable.

Results from these regressions are presented in table 3. Standard errors are clustered at the tax filing unit level. After accounting for time-invariant characteristics (e.g., preference for receiving refunds) and other demographic characteristics, our results show that the persistence in balance location depicted in the raw tabulations remains. Those with

Table 1
Summary Statistics by Balance Position

	Large Balance Due		*Small Balance Due*		*Small Refund*		*Large Refund Due*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
Age of Primary	44.02	(7.21)	44.23	(7.34)	42.94	(7.39)	41.17	(7.10)
Male Primary Filer	0.78	(0.41)	0.81	(0.40)	0.75	(0.43)	0.64	(0.48)
Exemptions for Children Living at Home	0.8	(1.07)	0.73	(0.99)	0.74	(1.01)	1.25	(1.17)
Single	0.33	(0.47)	0.28	(0.45)	0.38	(0.49)	0.22	(0.42)
Married Filing Joint	0.55	(0.50)	0.63	(0.48)	0.52	(0.50)	0.43	(0.50)
Married Filing Separate	0.05	(0.21)	0.04	(0.19)	0.02	(0.15)	0.02	(0.13)
Head of Household	0.07	(0.26)	0.05	(0.22)	0.07	(0.26)	0.33	(0.47)
Average Median Adjusted Gross Income	71,504	(6,050)	80,387	(6,543)	60,810	(11,660)	47,271	(11,734)
Average Median Wages	43,714	(14,493)	64,996	(15,676)	57,222	(10,461)	45,077	(10,527)
Average Median Taxable Income	49,360	(5,917)	58,049	(6,400)	39,298	(12,511)	24,772	(12,590)
Average Median Balance	2,992	(1,178)	1,262	(1,274)	-1,912	(1,078)	-3,164	(1,085)
Proportion with Business Income	0.39	(0.49)	0.13	(0.34)	0.09	(0.28)	0.08	(0.27)
Proportion with Estimated Payments	0.19	(0.39)	0.09	(0.29)	0.05	(0.22)	0.04	(0.19)
Observations	26,874		26,879		117,750		117,745	

Monetary variables are in 2009 dollars. Average median values calculated by averaging the 10 middle observations.

Table 2
Transition Probabilities

	Current Year				
Previous Year	*Large Balance*	*Small Balance*	*Small Refund*	*Large Refund*	*Total*
Large Balance	8,941 45.34	3,059 15.51	4,727 23.97	2,992 15.17	19,719 100
Small Balance	3,071 13.97	7,620 34.66	9,084 41.32	2,211 10.06	21,986 100
Small Refund	4,689 4.84	9,074 9.37	65,658 67.8	17,422 17.99	96,843 100
Large Refund	2,717 3.02	2,053 2.28	18,973 21.09	66,206 73.6	89,949 100
Total	19,418 8.5	21,806 9.54	98,442 43.08	88,831 38.88	228,497 100

Table 3
Balance Experience Based on Previous Year Balance Experience

Variables	*Large Balance*	*Small Balance*	*Small Refund*	*Large Refund*
Large Balance in T-1	0.363*** (0.004)	0.065*** (0.003)	-0.148*** (0.004)	-0.036*** (0.003)
Small Balance in T-1	0.084*** (0.003)	0.259*** (0.004)	-0.051*** (0.004)	-0.066*** (0.002)
Large Refund in T-1	-0.015*** (0.001)	-0.039*** (0.001)	-0.144*** (0.002)	0.461*** (0.002)
Married Filing Joint	0.017*** (0.001)	0.048*** (0.001)	0.119*** (0.003)	-0.068*** (0.002)
Exemptions for Children Living at Home	-0.007*** (0.000)	-0.016*** (0.000)	-0.079*** (0.001)	0.045*** (0.001)
Age	0.003*** (0.001)	0.000 (0.001)	0.013*** (0.002)	-0.009*** (0.002)
Age Squared	-0.000** (0.000)	0.000 (0.000)	-0.000*** (0.000)	0.000*** (0.000)
Constant	-0.033* (0.019)	0.049** (0.020)	0.133*** (0.042)	0.432*** (0.032)
Observations	280,249	280,249	280,249	280,249
Number of Taxpayers	46,433	46,433	46,433	46,433

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

large balances due are more significantly likely to have had balances due in the previous year than to have had a refund in the previous year. Likewise, those with large refunds are significantly likely to have had a large refund in the previous year.[4]

Balance Position by Age and Gender

Next, we consider whether there is a systematic pattern in refund behavior over the life cycle. We look at the proportion of tax filing units in each group by the age of the primary filer separately for male and female primary filers in figure 1. Overall, female primary filers are much more likely to receive a large refund, with roughly 60 percent of these individuals receiving a large refund at age 35. Relative to male primary filers, the decline in the proportion of female primary filers receiving large refunds appears to come later in life, and the

Figure 1a: **Male Primary Filers**

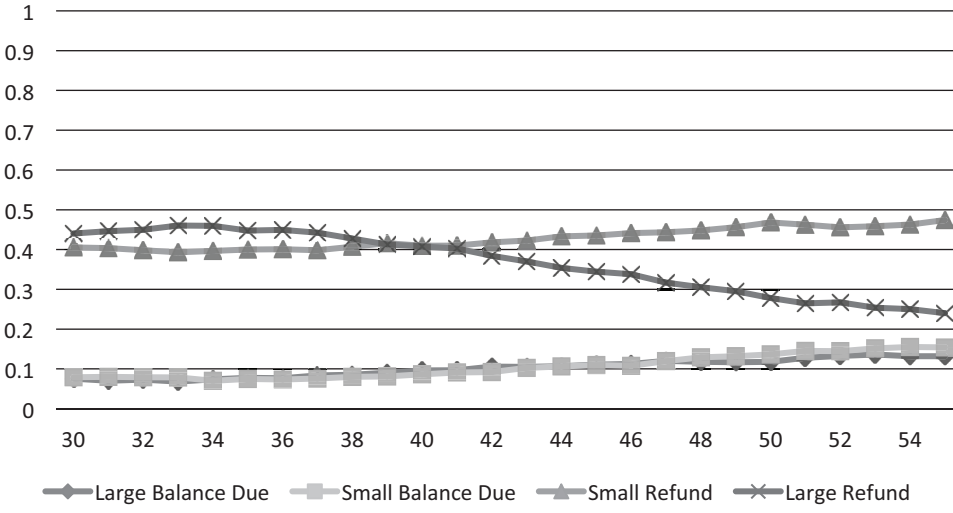


Figure 1b: **Female Primary Filers**

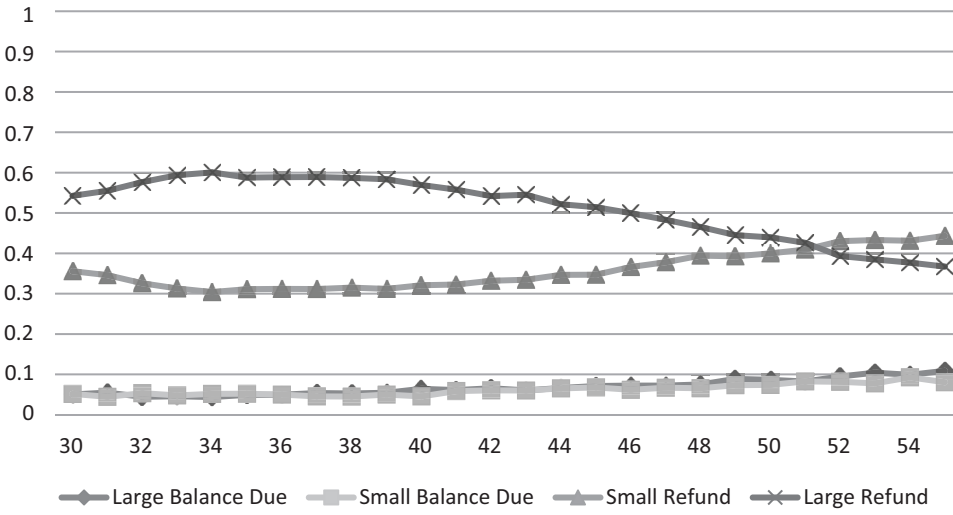


Figure 2a: **Trends for Taxpayers with Large Refunds**

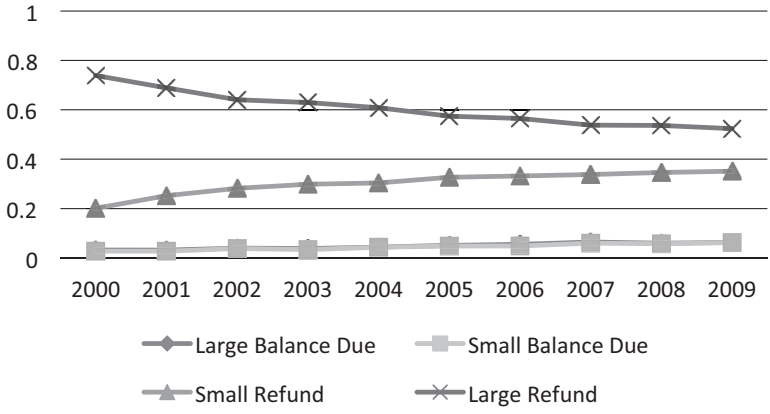


Figure 2b: **Trends for Taxpayers with Small Refunds**

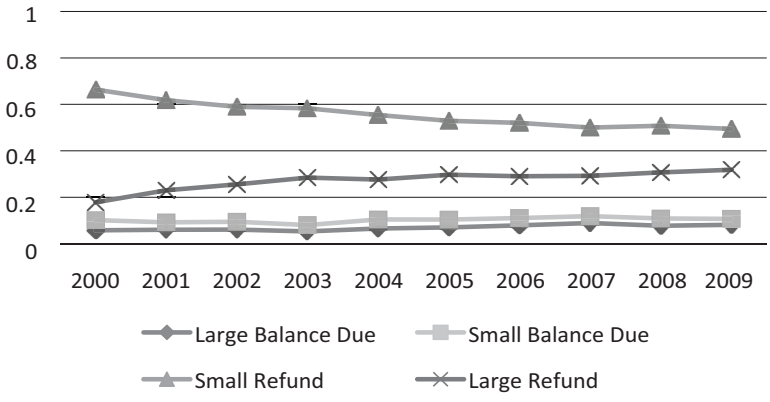


Figure 2c: **Trends for Taxpayers with Small Balances Due**

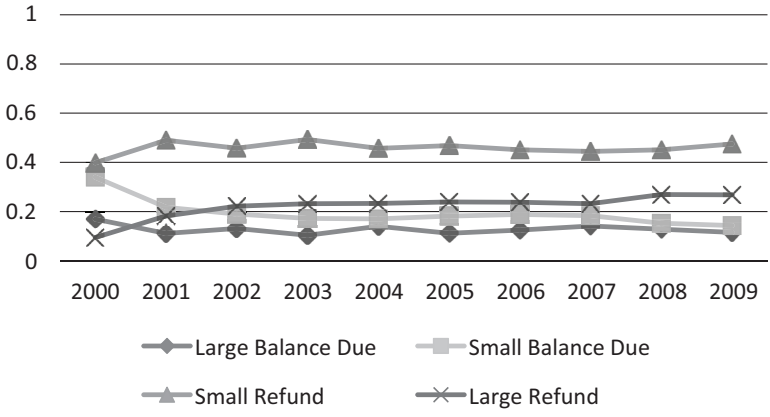
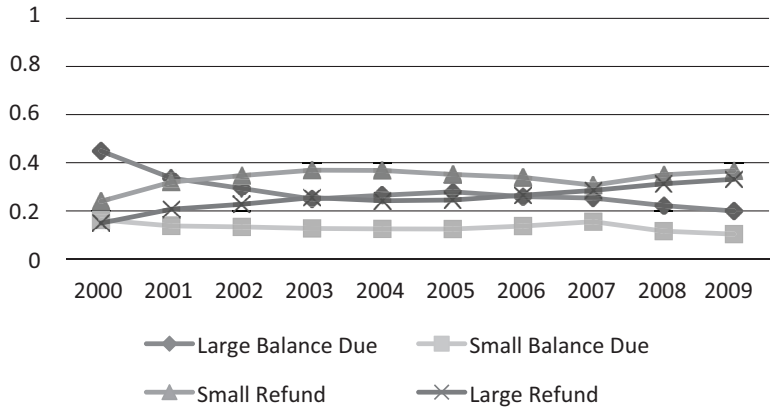


Figure 2d: **Trends for Taxpayers with Large Balances Due**



drop is less stark. There is a larger switch from large refunds being the dominant category to small refunds being the dominant category for female primary filers compared to male primary filers. These patterns may be explained by the fact that female primary filers are predominantly single mothers. Nearly 54 percent of 35 year-old female primary filers claim single or head of household status on their tax returns.

Longer Term Trends

Lastly, we follow taxpayers over time to examine balance position patterns. We restrict the sample to a balanced panel and plot trends in balance location for subgroups based on initial balance location in 1999. The sample consists of 12,876 taxpayers a year, with over 80 percent having a refund in 1999. Figure 2 presents the proportion of taxpayers in each balance location by year.

Conditional on having a relatively large refund due in 1999, the proportion of taxpayers who have a large refund decreases over time from about 74 percent in 2000 to 53 percent in 2009. Taxpayers appear to shift from having a large refund to having a small refund due, while the proportion of taxpayers who owe a balance remains roughly constant over time. Conditional on having a relatively small refund due in 1999, decreases over time in the proportion of taxpayers with a small refund are offset by increases in the percentage of taxpayers with a large refund. The proportion of taxpayers with balances owed remains constant over time.

The trend among taxpayers with relatively small balances in 1999 indicates a shift in the proportion of taxpayers with balances due to refunds during the first few years (2000-2003). This change might occur because taxpayers increase tax payments or because of changes in tax unit structure and income that are not accounted for here. From 2003 onward, the proportion of taxpayers in each balance location remains fairly steady with small declines in the fraction with large balances owed and small increases in the fraction with large refunds due.

For taxpayers with a relatively large balance owed in 1999, the proportion of taxpayers remaining in this group decreases sharply from 2000-2001, from about 45 percent to 34 percent and continues to decrease to about 20 percent in 2009. While the proportion of taxpayers with a small balance owed remains roughly constant over time, the percentages with a small and a large refund fluctuate over time, but stay between 15 percent and 40 percent.

To further examine the longer-term trends in balances, we look at how often each taxpayer falls into the same balance location conditional on the balance location in 1999. Among taxpayers with relatively large refunds in 1999, about 43 percent have a large refund in at least 8 out of the 11 years of the panel. This result supports that there is persistence in receiving a relatively large refund. Conversely, only 9 percent of taxpayers with relatively large balances owed in 1999 have a large balance owed in 8 out of 11 years. Therefore, there is much less persistence in having a large balance owed. Conditional on having a small refund due in 1999, about 38 percent of taxpayers have a small refund due at least eight years. Conditional on

owing a small balance, about 4 percent owe a small balance for at least eight years, suggesting these taxpayers are moving to other categories over time.

CONCLUSIONS

Understanding individuals' choices over how much income to withhold against their tax liability is a difficult task. There are many parameters that go into computing one's tax liability (e.g., family composition, home ownership) and changes to these parameters may have tax consequences that are not well understood by the taxpayer. In this paper, we document patterns in tax balance experiences by taxpayers in the U.S. As with other empirical findings, we find a large degree of persistence with refunds. This persistence in refund receipt exists even when controlling for a time-invariant preference for receiving refunds relative to writing a check to the IRS. While we find some short-term evidence of persistence in having large balances owed within two years, this persistence diminishes over a longer horizon.

Notes

[1] Tax liability refers to tax liability after deducting refundable credits.

[2] For parsimony, we refer to the refund amount that a tax filing unit is eligible for as a "refund." However, because tax filers can apply refunds to offset the next year's tax liability, this may not be the refund amount that is actually received.

[3] 55,551 tax returns with taxable income equal to zero are excluded.

[4] We obtain similar results when we include log AGI or log taxable income as an additional control, both in terms of magnitude of the estimated coefficients and in statistical significance.

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